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MEMORANDUM TO THE DEPUTY MINISTER OF EMPLOYMENT AND SOCIAL DEVELOPMENT

AI-Powered Career Recommendation Engines And The Evolution Of Public Employment Services

L'utilisation de l'intelligence artificielle (IA) et des outils de recommandation en carrière dans la modernisation des services publics de l'emploi

(FOR INFORMATION)

SUMMARY

- The rapid evolution of labour markets and of information technology has caused governments to rethink approaches to the sourcing of occupational and skills information, as well as ways through which employment supports such as employment counseling and job search assistance are offered to job seekers.
- This note provides you with a snapshot of the increased use of "big data" and artificial intelligence (AI) engines to deliver public employment services (PES) in countries such as Australia and France.
- This note also provides you with an update of efforts underway in Canada to maximize the value of the labour market and career information that is presented to Canadians.

BACKGROUND

- The changing nature of work - both in the ways work is being structured (e.g. gig work), and in the type of tasks being performed, or automated - is placing greater emphasis on the need for timely, relevant and local/granular labour market information to help Canadians make optimal employment-related decisions.

Thanks for this, I appreciate the update.

Canada

- Governments' traditional reliance on surveys to collect labour market data have proven in many instances to be costly and difficult to carry out. Surveys may also suffer from issues of under-sampling, and the collected data is often obsolete due to the time-lag between the start of the distribution and the end of the analysis.
- With the continued decline of survey response rates, has come a greater recognition that governments should consider alternative data sources, namely the drawing down of data from administrative systems and the web, to produce new angles of labour market analysis.
- Governments across the globe have recognized the value of harnessing "big data" to extract labour market insights, due to the volume (or quantity of information), variety (or multitude of information types) and velocity of this information (or speed with which data is stored, analyzed, and updated).
- There exists great potential to harness this information and provide it to consumers in real time and in customized formats, to facilitate career and labour market decision-making.

Australia

- In Australia, the national government recently announced the creation of a *Jobs and Education Data Infrastructure (JEDI)* data engine that "combines large-scale, disparate data sets on skills, jobs, and the Australian labour market to answer the different information needs of multiple users."
- We understand that you were briefed on this initiative during your visit to Australia earlier this year.
- The JEDI system is currently testing the use of analytical methods such as probability, natural language processing and machine learning, in order to help:
 - *individuals* identify the skills they have, the jobs they'd like to do, and how to bridge skills gaps;
 - *employers* identify the skills of their staff, the skills they need, and to identify what skills are trending in their sector; and
 - *education providers* identify which training offerings lead to employment, and anticipate future skills demand.

- A presentation obtained by ESDC on the Australian JEDI system prototype provides a high-level description of some of the data sources and variables being considered to help formulate tailored employment recommendations for individuals. These include: a review of the individual's past education and work experience, current work interests, skills transferability and gap analysis, and historical employment trends by region. No variables were provided for the employer and education provider models.
- It should be noted that a portion of Australia's JEDI engine appears to have been developed by the American data analytics firm *Burning Glass Technologies*, a well-recognized labour market insights firm that provides analysis on jobs and skills data, using proprietary tools and models. The company has partnered with various other countries to produce jobs and skills reports (e.g. Singapore), and is currently working with the province of Ontario to identify "in-demand skills and knowledge" areas within their job profiles. ESDC/Job Bank has held discussions with *Burning Glass Technologies* and its competitors (e.g. *Microsoft/Linked IN*) in recent years to discuss potential partnership opportunities, as well as to learn more about their products and offerings.

France

- In France, *Pôle emploi* serves as the country's primary job board and is the country's central hub for public employment services.
- In 2016, Bayes Impact, a non-profit organization using technology and AI to tackle complex social issues, created *Bob emploi*, a website to support job seekers in their job search, and offering personalized action plans based on an individual's current circumstances.
- *Bob emploi* uses algorithms that match data from a series of sources, including the experiences of other active site users, to generate career advice and recommendations for job seekers.
- In a presentation to ESDC officials in recent months, *Bob emploi* noted that the organization's ultimate goal would be to create a hybrid system in collaboration with *Pôle emploi* in which advisors would provide human and psychological support and the "Bob" engine would provide job search and training information.

Other countries

- Other countries considered leaders in the delivery of e-government services such as the United Kingdom, Korea and Singapore, have systems in place to manage multiple databases to unearth labour market insights, including data on unemployment insurance, job matching, and training.

CURRENT STATUS

- In Canada, Employment Assistance Services (EAS), (i.e. lighter-touch employment supports such as employment counseling, job search assistance and the development of return-to-work action plans), are designed and delivered by provinces and territories (PTs) with federally-funded support provided under the labour market transfer agreements, which include the Labour Market Development Agreements (LMDAs) and the Workforce Development Agreements (WDAs).



- ESDC's Job Bank is currently exploring ways to help job seekers identify the skills they have, and need, in order to help them reach their career goals. The program is prototyping approaches to identify skill gaps based on several reference points including job seeker resume information, and employer job postings. Machine learning technology would also identify transferable skills and recommend other career paths that job seekers could take.
- In recent years, ESDC and Statistics Canada have made investments in the *Education and Labour Market Longitudinal Platform* (ELMLP). The ELMLP is a relational data environment linking multiple datasets, including post-secondary education information, apprenticeship information and tax data. The platform will equip Canadians with the information they require to make informed career decisions, including how a person's field of study and type of credential could impact their employment outcomes. ESDC hopes to maximize the insights generated from this platform through the

addition of other datasets, based on priorities and capacity. For example, plans to add data from the Canadian Student Loans Program (CSLP) and the Longitudinal Immigration Database (IMDB) are currently underway.

- Other ESDC programs are also either funding or following efforts to match Canadians to skills training opportunities and jobs. For example:
 - The *Future Skills Centre* is funding a \$2.5M project with the Ontario Tourism Education Corporation (OTEC), First Work, and MaRS Discovery District that will identify occupations that fit with youth job seekers' interests and provide recommendation on the skills needed to be successful in those roles.
 - *Bow Valley College* has put forward a new platform known as Pivot-Ed - designed to assess employees' skills, regardless of how they were acquired, and convert these into recognized micro-credentials that employees could use to demonstrate their skill levels to potential employers.
 - ESDC's *Student Work Placement Program* is also working with partners Magnet and Orbis to have their *Campus Connect* platform include competency-based job-matching technology to help students effectively communicate their skills, education and experience to potential employers.
- Job Bank, Service Canada, the Ontario region, and the ESDC Innovation Lab are working collaboratively to revisit the way claimant information sessions (CIS) are delivered to improve job search supports for EI claimants. The project will seek to transform and revitalize these sessions to address unique local community, employer and individual needs.
- Predictive analytics will be applied to local labour market and socio-economic information to anticipate employer needs and to identify industry trends, potential labour supply issues and skills shortages to actively affect the local economy by making direct linkages between employer hiring needs and claimant's skills through CIS sessions.

NEXT STEPS

- ESDC officials have exchanged a series of emails with Australian counterparts to share technical information about the inner workings and algorithms of both JEDI and Job Bank systems. ESDC will continue to monitor Australia's progress on the implementation of JEDI.

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